

Remarks

The Applicants have cancelled Claims 6-7, 13, 16 and 18. The Applicants have amended Claim 11 to further include the steps of (1) slow cooling for 1 to 5 second at a rate of 10°C/s or less in the temperature range of 700 to 800°C/s, and (2) cooling at a rate of 20°C/s or more. Support may be found in the Applicants' Specification on page 40, for example, in the paragraph spanning lines 3-13. Entry into the official file and consideration on the merits is respectfully requested.

Claims 6-7, 11, 13 and 16-18 stand rejected under 35 U.S.C. §103 over EP'167. The Applicants respectfully submit that the rejection is now moot with respect to Claims 6, 7, 13, 16 and 18 in view of their cancellation. The Applicants also respectfully submit that EP'167 fails to teach or suggest the subject matter of Claims 11 and 17.

Steel plates produced according to the claimed method include 100 ppm or more of N in the dissolved state in the steel. The steel also has a structure in which the areal rate of the ferrite phase having an average grain size of 10 μm or less is 70% or more and the areal rate of the martensite phase is 5% or more. The martensite phase is useful in materializing superior ductility while exhibiting high strength, a high BH and a ΔTS . Further, the martensite phase improves the shape fixability which is brought about by the reduction in the yield ratio.

Precise control of cooling is indispensable for realizing the martensite phase of 5% which securing a predetermined areal rate of the ferrite phase. Specifically, the desired steel structure can be obtained by performing the steps of 1) immediately applying, after finish rolling, rapid cooling from austenite single phase region to increase the degree of undercooling so as to increase the driving force of ferrite transformation, 2) slow cooling at a ferrite transformation temperature in a range of from 700 to 800°C to obtain ferrite of a predetermined areal rate generated therein while distributing and stabilizing C in the steel to the austenite phase, and 3) applying subsequent rapid

cooling so that the austenite phase is transformed into martensite. At the same time, after the additional amounts of Al and N and the balance of N/Al are adjusted, the initiation timing of rapid cooling and rapid cooling rate are thereby controlled such that high strain aging hardening property can be secured.

The Applicants respectfully submit that EP'167 fails to teach or suggest the claimed subject matter as generally described above. Further, the Applicants respectfully submit that EP'167 fails to disclose, teach or suggest the Applicants' three steps of cooling including cooling at a cooling rate of 20°C/s or more within 0.5 seconds after the finish-rolling, slow cooling for 1 to 5 seconds at a rate of 10°C/s or less and the temperature range of 700 to 800°C, and cooling at a rate of 20°C/s or more.

In sharp contrast, EP'167 teaches something quite different. For example, paragraph [0017] of EP'167 discloses cooling at a cooling range of about 50°C/s or more within 0.5 second after finish-rolling. There is no teaching or suggestion of a second type of cooling such as the Applicants' claimed slow cooling followed by a third step of cooling at yet a different rate.

EP'167 also discloses in paragraph [0036] the same type of cooling at 50°C/s or more within about 5 seconds of finish-rolling. Similar teachings may be found in paragraph [0066]. Further teachings with respect to the cooling of EP'167 may be found in essentially the entire paragraph of paragraph [0067]. However, that detailed discussion in paragraph [0067] merely reinforces the earlier teaching of a single step of so-called "super cooling" performed within about 0.5 second after finish rolling at a cooling rate of about 50°C/s or more.

The Applicants therefore respectfully submit that EP'167 fails to disclose, teach or suggest the Applicants' combination of cooling steps at a cooling rate of 20°C/s or more within 0.5 second after finish rolling, slow cooling for 1 to 5 seconds at a rate of 10°C/s or less in the temperature range

of 700 to 800°C, and cooling at a rate of 20°C/s or more. Withdrawal of the rejection of Claims 11 and 17 based on EP'167 is accordingly respectfully requested.

Claim 8 stands rejected under 35 U.S.C. §103 over the combination of JP'601 with EP'167. The Applicants respectfully submit that the rejection is now moot in view of the cancellation of claim 8. Withdrawal of the rejection is also respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



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